

Robinson (2)

Hon. C. J. Prescott

Box 11.

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MR. LUTHER ROBINSON'S  
PLAN FOR VENTILATING

THE WINGS OF THE  
PHILADELPHIA HOUSE OF CORRECTION.

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JUNE, 1873.

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BOSTON, May, 1873.

*To the Committee on the House of Correction,*

*Philadelphia, Penn.*

GENTLEMEN, — I have not yet fully discussed with the builder or architect my plan for the proper ventilation of the new prison at Holmesburg. This I shall endeavor to do before the time of your next meeting, and hope then to be able to make a definite proposal for applying to the eight wings containing the cells, our system of ventilation, already illustrated in your presence. Of its success, some members of your committee have seen an example in the workshop and new wing of the State Prison in Trenton.

A plan which secures such results in New Jersey, can not fail, if properly applied on the opposite side of the Delaware, twenty miles below.

It has been applied, with like success, to four State-Houses, four State-Prisons and many other prisons; to many hundreds of Cotton and Woollen Factories, School-Houses, City and Town Halls, Lecture-Rooms, Hospitals, Churches, and other buildings.

The results universally secured are in marked contrast with those of any other plan.

The true philosophy of ventilation I have orally explained to you, but for the use of any who may wish more fully to consider its principles, and in order to give a general idea of the plan which I would propose for this prison, I insert an extract from my Report on the ventilation of the United States Capitol.



“The proper ventilation of the Capitol, as of other buildings, requires the furnishing of an abundant supply of fresh air, its proper distribution, and the effectual removal of air from all parts of the building.

“By the system of ventilation which I have orally explained to you, all of these objects are satisfactorily accomplished.

“Beyond all doubt, fresh air is furnished, and impure air efficiently removed, and, with proper skill in the application of the system, without annoyance from currents.

“To the roofs of buildings we apply structures of iron or other material, — *ventilators* of peculiar construction, having mouths open in every direction, subdivided by several partitions, with tubes, straight or angular, long or short, as needful, subdivided to correspond with the divisions of the ventilators, extending through the upper portion of the building, and reaching proper points in or near the ceiling of the room to be ventilated. We thus establish communication, through numerous passages, between the room and the external air.

“Through these ventilators and connecting tubes, *alternating currents of air pass*. Through some of them fresh air passes in, and is properly distributed, while through others impure air passes out, securing thus the real, efficient, *quiet change of air*, which constitutes good ventilation.

“This is not theory, but fact, easily ascertained by intelligent examination of any one of the thousands of these ventilators already in use; and the results of the change are manifest to the most casual observer.

“Over the Capitol, and within ten feet of its roof, an abundance of air passes, every day in the year, to ventilate, even excessively, more than a score of such buildings. It moves with a momentum, varying indeed with its velocity, but ever sufficient for our purpose.

“We use this undoubted ‘power of the air’ as one of *two* forces to accomplish our end. Whatever its velocity or direction, it presses against some face and into some mouth or mouths of these ventilators, and is conducted through some of the tubes to the room, as surely as water and illuminating gas, under pressure, are driven through their pipes to distant points for convenient use.

“The necessary consequence of the influx of air is condensation, if the room is tight, or exit if not tight. But with the construction described there *can* be no condensation, as some faces under the lee, less pressed than those against which the wind blows, allow easy exit to the air driven out in consequence of the entrance of air on the opposite side.

“This operation is visible to all who, on a frosty day, pass any of the three hundred drying and dressing rooms on which these ventilators are used.

"From three rooms of this class, under control of members of the present Congress, moisture enough has already been removed, to form, when condensed, not less than forty thousand barrels of water.

"The ordinary heat of a room, from whatever source derived, acts as another motive force, establishing and keeping up this same alternation of currents, even without the aid of wind.

"Heat drives air through some of these passages, and not through all of them, while external air, even by its weight alone, falls in to supply its place.

"This is demonstrable *fact*, which no argument can make more plain, nor any theorist disprove.

"Thus, considering the impure air of a room simply as matter, subject solely to the laws of force, moving *only as moved*, we have at our command, and through these structures use, as forces, *wind and heat*, acting efficiently, separately or concurrently, effecting the desired change of air.

"We thus provide for the efficient and quiet ventilation of any building, at all times, unless in the extremely rare but theoretically possible case of the failure of both forces.

"But if, by respiration and radiation the temperature of the air is not increased, and if, at the same time, there is no appreciable movement of the external air, it is perfectly safe, and may add to comfort, to open all doors and windows.

"Providing, as we do, for all cases in which it is desirable to close them because of the discomfort due to cold air or to currents; securing, as we do, at all such times, results closely bordering on perfection; we need not to be too solicitous in regard to a possible conjuncture of conditions which may not exist during a single hour in a year, and for which provision can be made *only*, EVEN IF, by the use of "mechanical power," already at your command.

"Our ventilators standing on the roof, so low as not to be conspicuous from the ground, should be sufficiently large and numerous to correspond to the wants of the largest audience; only a portion of them being in use when the audience is small.

"The tubes or boxes in the attic would need to be very large and complicated, extending over the entire galleries on all sides of the halls.

"The ceiling over these galleries is very open, affording all or nearly all of the needed space.



"In the ceiling of the Senate Chamber, no change would be needed, and, in that of the House, only an enlargement of the openings at about 200 points, between the brackets, next to the walls on all sides of the hall, — a change not noticed unless on close inspection.

"All of these *pores* in the ceiling would be used for the actual passage of the incoming and outgoing air.



"They are admirably arranged for its proper distribution, in streams mild as the gentlest shower, the rising vapor, or the falling snow.

"The halls might almost be said to breathe, taking in the good and expelling the bad air. If all breathe in unison, the halls as fast as the audience, as they may, nothing better can be required. Let the carbonic acid, OBSERVANT OF FUNDAMENTAL LAW, float into the outer air, as it will, all *authorities* (?) and all theories to the contrary notwithstanding, and we need have no fear that vegetation will fail to perform its work, and make the needful restoration. (*Sapientibus loquor.*)

"From this 'carbonic acid question,'  ON WHICH NO DARKNESS NEEDS TO REST,  it would afford me pleasure, if time allowed, to brush the mists and myths with which false teaching has surrounded it.

"Orally, I often discuss it in full, and shall be pleased *thus* to give to the Committee, if they desire, the facts and the law of the case."

Your buildings, so far as constructed, I have carefully examined, and for their full and proper ventilation I would use four of our largest ventilators on each of the eight wings.

Some of the boxes should be so constructed as to open at proper points, through the ceiling of the upper stories in front of the cells.

Others, branching in the attic, would pass through the upper story to the ceiling of the lower, adjacent to the outer walls.

In addition to this, branch boxes in the attic would connect with and cover all the flues in the brick walls at the rear of the cells, and thus ensure, to a considerable extent, direct ventilation of each cell.

This, in addition to what is proposed in front of the cells, will secure, beyond all doubt, much more satisfactory ventilation than it is possible to secure on *any other known plan*.

Of the plan adopted and partially applied, I would say not a word if it were a matter of small importance. But as it is one involving very great expense for numerous large chimneys, subterranean passages, and steam-pipes, and a constant large expenditure for fuel, and as *its results must of necessity be unsatisfactory*, a brief reference to it I trust will be deemed excusable.

It is the old and oft-tried experiment of attempting to secure good ventilation, by the force of heat to push air into a room, and of heat to aid in its ejection.

I have long sought, but have thus far failed, to find even a single case of more than a poor approximation to success on this plan, too often recommended for its specious, but ever-deceptive promise.

Similar failures I can show in noted cases, in which, to the propelling power of heat from chimneys or steam-pipes, is added a motive power through fans, to furnish *or* to remove air; and in more than one large case, in which powerful fans are used to furnish, and others to remove air at the same time.

The philosophical reasons for their failure it is easy, but not necessary, now to state. The *fact* of their failure is beyond all doubt.

A movement of air may indeed be thus secured; but mere theorists may yet learn that movement is not necessarily *requisite change*; that there may be a rapid influx or a rapid efflux of air, or both at the same time, without securing good ventilation; and that the laws of inertia and momentum forbid success from such use of expensive force.

Our plan for ventilation works perfectly in connection with every system of WARMING, but in this case it would be excellent economy to abandon the plan of indirect warming, and arrange steam-pipes adjacent to the walls in front of the cells.

Less pipe would be needed, large amounts of coal saved, and the change would involve no appreciable detriment to the ventilation, *whatever system may be used*.

If ours had been originally adopted, more than three-fourths of the prime cost of the present plan would have been saved, and much better results secured.

If it should *now* be adopted, and superfluous work now required should be omitted, the resulting saving in prime cost *alone* would be more than abundant compensation for the full and perfect application of our system.

But if not a dollar should be allowed by the builder, for



release on any part of his contract ; if the original plans should be fully applied ; it would still be important to have our system adopted as an entire addition to the original plans, economizing fuel to the extent of MANY HUNDREDS of TONS ANNUALLY, and adding largely to the comfort, healthfulness, and working capacity of the inmates of the prison.

As soon as practicable, I will make a definite proposal, on the basis either of substitution or of addition.

Very respectfully,

LUTHER ROBINSON,

*Agent of U. S. Ventilation Co., of Boston.*

MR. ROBINSON.

NEW HAMPSHIRE STATE PRISON, }  
CONCORD, N.H., Jan. 29, 1868. }

*Dear Sir,*—With great pleasure I add my testimonial to the value of your system of ventilation.

Bad air has long been one great cause of disease in our prison, with the old means of ventilation, which was of little benefit. But now all are of one opinion : that the Robinson Ventilator is a PERFECT SUCCESS.

During the last five months, pure air has been so abundantly infused into the cells that hardly any of the former odor is now perceptible.

We now, in cold weather, feel the beneficial effects more fully, as our windows are kept closed during the night.

Already there is a visible improvement in the physical condition of the convicts, who often speak to me of the contrast; and could they all bear testimony, they would say Mr. Robinson is their benefactor.

JOSEPH MAYO, *Warden N.H. State Prison.*

The Boston School Committee, in their Annual Report, say of the Bowditch School-house:—

“When eight hundred pupils, as in the Bowditch School, with no doors or windows open for ventilation during many months, and with no discomfort from currents of cold air, can enjoy the luxury of an atmosphere so nearly pure as to be indistinguishable in respect to purity from the external air, we may well be gratified with a result so greatly in advance of any that we had previously known.”

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“THE SUCCESS OF THESE VENTILATORS HAS BEEN COMPLETE, AND ENTIRELY SATISFACTORY, AND CAN NOT BE QUESTIONED.”